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for guns and rifles, and a spherometer of great delicacy. The Rev. John Bacon's aerial photographs were extremely interesting. They were obtained recently from balloons in unique circumstances. Mr. T. Matthews showed some incandescent oil-burners which have been designed by him, primarily for use in the Trinity House lighthouse service. The arrangement, like that of most of the other exhibits, is too elaborate to be understood by mere verbal description; but it may be stated that the intensity of a single mantle burner for flashing lights is 1,100 candles, and the consumption of oil one pint per hour, while the intensity of a triple mantle-burner, for fixed and occulting lights, is 2,700 candles, and the consumption of oil three pints per hour.

From the Solar Physics Observatory, South Kensington, were photographs illustrating a comparison of the arc spectra of various samples of dust, showing what chemical elements are represented in the samples. There were also some very interesting and convincing curves illustrating the long-period solar and meteorological (rainfall) variations of about thirty-five years. As might have been expected, a number of exhibits were connected with the recent destructive volcanic phenomena in the West Indies, which were investigated by a commission sent out by the Royal Society. There were a number of photographs illustrating the late eruptions in St. Vincent and Martinique and also specimens of the volcanic dusts, ashes and other *ejecta* of the West Indian volcanoes. It need hardly be said that Mr. Arthur J. Evan's exhibit illustrative of the excavations at Knossos, in Crete, deservedly attracted considerable attention. The exhibit consisted of a general plan of the Palace.

There were a considerable number of biological exhibits, which can only be

briefly alluded to. Deserving of careful study are the results of the experiments shown by Miss E. R. Saunders illustrative of what she calls structural atavism, resulting from cross-breeding in plants. Dr. A. Macfadyen and Mr. S. Rowland, of the Jenner Institute of Preventive Medicine, illustrated their methods of disintegrating cells and micro-organisms and of obtaining their intracellular constituents. Dr. Alan B. Green had an exhibit illustrating the method of preparation of chloroformed calf lymph, from the government lymph laboratories. Dr. G. H. Fowler showed specimens of a remarkable radiolarian, differing in structure from all other forms hitherto described, and Dr. H. Gadow a very beautiful illustration of the development of the color pattern in Mexican species of lizards and a convincing illustration of the influence of environment. The five specimens of sea snakes that swarm round the coasts of India and in other tropical seas, exhibited by Dr. Leonard Rogers, their poison being more powerful than that of any other snakes, though interesting in their way, can hardly be said to have been attractive. Miss Dorothy Bate showed the remains of pygmy elephant and pygmy hippopotamus, obtained from caves in Cyprus.

The exhibition by means of the lantern of Sir Benjamin Baker's magnificent slides illustrative of the Nile Dam works, it need hardly be said, met with universal admiration. Dr. Cantellani's specimen of *Trypanosoma*, found in sleeping-sickness patients in Uganda, should be mentioned. There were many other exhibits in the rather crowded rooms, all of them illustrative of important scientific work.

SOCIETIES AND ACADEMIES.

NEW YORK ACADEMY OF SCIENCES.

SECTION OF BIOLOGY.

A REGULAR monthly meeting was held at the American Museum of Natural History

on May 11, Professor Bashford Dean presiding. Papers were presented by Professor H. F. Osborn, Professor E. L. Thorndike and Mr. C. T. Brues.

Professor Osborn's paper, 'On Recent Models and Restorations of a Number of Extinct Animals, with a Discussion of their Probable Habits and Mode of Life,' was based upon models and restorations from the Department of Vertebrate Paleontology of the American Museum of Natural History, prepared by Charles Knight under the direction of the speaker, with the assistance of other members of the department. Numerous models and drawings were exhibited and described. Of special interest were the following: *Elephas imperiales* (Imperial mammoth); *Trilophodon productus* (Miocene mastodon); an *Ichthyosaurus* and young; several Pleistocene rhinoceroses; and *Diplodocus* (a bird-catching dinosaur).

Professor E. L. Thorndike, on 'Natural Selection and Fertility in Man,' reported a study of the size of families of college graduates during the nineteenth century, and of the descendants of a New England family during the eighteenth and nineteenth centuries. The average number of children in the latter case rose gradually to an acme in the generation born about 1720, and then fell steadily, the figures for eight generations being 5.3, 6.3, 7.7, 10.0, 7.2, 5.5, 4.4, 3.8. This rise is inconsistent with the common hypothesis that social custom is the cause of change in the productivity of races. So also is the form of the surface of frequency of family size in the later decades of the nineteenth century (see *Popular Science Monthly*, May, 1903, p. 68). A real decrease in natural fertility would account perfectly for the statistical appearances found; and, if we judge only by them, is the most likely hypothesis.

Mr. Brues presented a preliminary account of the internal factors of regeneration and reversal of asymmetry in the crustacean *Alpheus*. Przibram and Wilson have recently shown that when the larger of the asymmetrical chelæ of these animals is amputated, the smaller one on the opposite side develops into

a claw of the large type, while a small one regenerates on the stump of the large one. If the nerve of the small claw be severed at the time of removing the large one, reversal does not take place, or only incompletely. Histological examination of animals in which such changes are taking place indicates that the regeneration and remodeling are influenced by the nervous system, due possibly to increased nutrition in the ganglion which supplies the small chela. As the nervous system shows no morphological asymmetry corresponding to that of the claws, it probably acts only in a passive way in determining the type of the claw, although it evidently gives the stimuli for the more minute changes which take place in the remodeling of a small chela to form one of the large type.

M. A. BIGELOW,
Secretary.

CLEMSON COLLEGE SCIENCE CLUB.

At the meeting of March 20, Dr. J. H. James read a paper on 'Some Facts and Theories in Regard to Dyestuffs.' The history of the processes of dyeing before the latter half of the nineteenth century was briefly told, but the achievements in the preparation of synthetic coloring matters were fully treated. The paper discussed the main points in the synthesis of alizarin and indigo, and the theories relative to the relation between the chemical composition of synthetic dyestuffs and their coloring power. Professor S. W. Reaves presented 'An Historical Note on the Invention of Logarithms,' at the close of which he illustrated the purpose and usefulness of logarithms by well chosen examples. Professor W. M. Riggs exhibited the Clark automatic switch board, the utility of which he demonstrated.

At the meeting of April 17, Professor J. H. M. Beaty presented a paper on 'Some of the More Important Characteristics of the Cotton Fiber.' Professor Beaty spoke of the difficulties encountered in the manipulation of the cotton fiber, and discussed its behavior when treated with dilute caustic potash before bleaching, and the apparent changes when brought in contact with a concentrated solu-

tion of caustic potash for mercerization. The lecture was illustrated with lantern slides as well as the fibers, which were also projected upon the screen.

The annual address before the club and student body was delivered on April 30, by Dr. Henry Louis Smith, of Davidson College, who selected for his subject 'The Intellectual Value of Scientific Training.' In further celebration of the date of organization, a banquet was given by the active members.

At the meeting of May 15, Professor P. T. Brodie gave a paper on 'The Development and Design of the Modern Bridge Truss.' Professor Brodie traced the evolution of the simple truss from the king-post to the types exemplified in the great bridges of to-day. The general criteria for maximum shear and moment from a given system of locomotive and train loading were deduced, and their applications of stress determination as used in the actual design of a Pratt railway bridge were clearly demonstrated. The lecture was illustrated with lantern slides and blackboard drawings.

The following officers have been elected for next year:

President—Chas. E. Chambliss.

Vice-President—R. N. Brackett.

Secretary-Treasurer—F. S. Shiver.

CHAS. E. CHAMBLISS,
Secretary.

DISCUSSION AND CORRESPONDENCE.

THE PROPOSED BIOLOGICAL STATION AT THE TORTUGAS.

TO THE EDITOR OF SCIENCE: I have been much interested in the discussion of the question as to the best place for the location of a tropical marine laboratory for research, which has been going on in the columns of SCIENCE for the past few weeks, and since we are all agreed on the desirability of such a station it is very proper that the problems involved in its establishment should receive careful consideration. I may be pardoned, therefore, if I say a few words in support of Dr. Duerden's contention that Jamaica is the best available place, for although I have never

visited the Tortugas, I have spent two weeks in Bermuda, and have made three trips to Jamaica, for zoological purposes.

My experience leads me to believe that a marine laboratory, and especially one in the tropics, ought to be situated where the advantages of civilization are reasonably accessible, and particularly the important one of competent medical assistance in case of accident or disease. We never plan to be sick or to meet with accidents, but we ought not to locate a permanent station where there is no possibility of help when it is most needed. The other advantages of a civilized community, such as good mail and telegraph facilities, good markets and satisfactory means of reaching other places, are of real importance and should not be ignored.

For these reasons the Tortugas seem to me seriously handicapped and even if regular service between them and Key West were maintained, I can not believe that in point of either time or expense, they would be as accessible to students from the central west as are the Bermudas. As between the latter and Jamaica, there can be little question that the larger island has the advantage, not only for the reasons so well presented by Dr. Duerden, but also because of the greater variety and abundance of its marine fauna. Good as is the collecting in Bermuda, it is better in Jamaica, partly because the latter island offers a greater variety of shores and bottoms. While Bermuda is undoubtedly more accessible, and can be reached at less expense, from New York, from all parts of the south and southwest Jamaica can be almost as easily and cheaply reached by means of the excellent steamers from Baltimore. Living expenses in Jamaica are very low, though perhaps not much lower than in Bermuda.

The one claim that is made for the Tortugas is the remarkable abundance and accessibility of the marine life, in both deep and shallow water. While this may be a point in which that station excels Jamaica, I am sure any one who has collected on the reefs of the latter will find it hard to believe that such is the case. But even were it so,